

## CLAIMS:

1. Method of enabling at least identification the presence data symbols that have been embedded in a media comprising the steps of:
  - obtaining a transmitted media signal ( $r$ ), (step 22), which comprises a possibly distorted version of a host signal in which data symbols have been embedded by quantisation
  - 5 using a certain quantisation step size and to which dither with a set of dither values has been added,
    - providing several dither value intervals within the set, where each interval corresponds to one or a small number of dither values, (step 26),
    - determining a histogram for each dither value interval, where a histogram is
  - 10 determined for all sample values of a set of signal samples of the transmitted media signal ( $r$ ) and having a dither value(s) in the corresponding dither value interval, (step 30),
    - combining the separate histograms corresponding to the intervals into a single histogram, (step 31), and
    - determining at least a rescaling factor ( $1/R$ ) based on the combined histogram,
  - 15 (step 32), in order to estimate the quantisation step size.
2. Method according to claim 1, further comprising the steps of estimating an offset ( $O$ ) of the transmitted media signal, (step 32), and removing the estimated offset from the signal, (step 34).
- 20 3. Method according to claim 1, further comprising the step of rescaling the signal using the rescaling factor ( $1/R$ ) in order to at least approximately restore the original media signal having embedded data, (step 36).
- 25 4. Method according to claim 3, further comprising the step of processing the rescaled signal ( $r'$ ) in order to detect or extract the embedded data, (step 38).
5. Apparatus (10) for enabling at least identification the presence of data symbols that have been embedded in a media signal and comprising:

a signal obtaining unit (12) arranged to obtain a transmitted media signal (r) comprising a possibly distorted version of a host signal in which data symbols have been embedded by quantisation using a certain quantisation step size and to which dither with a set of dither values has been added, and

- 5        a signal distortion determining unit (14) arranged to:
  - provide several dither value intervals within the set, where each interval corresponds to one or a small number of dither values,
  - determine a histogram for each dither value interval, where a histogram is determined for all sample values of a set of signal samples of the transmitted media signal
- 10      having a dither value in the corresponding dither value interval,
  - combine the separate histograms corresponding to the intervals into a single histogram, and
  - determine at least a rescaling factor (1/R) based on the combined histogram in order to estimate the quantisation step size.
- 15      6.        Apparatus according to claim 5, wherein the signal distortion determining unit is further arranged to estimate an offset (O) of the transmitted media signal and further comprising a unit (16) arranged to remove the estimated offset from the signal.
- 20      7.        Apparatus according to claim 5, further comprising a multiplying unit (18) arranged to multiply the rescaling factor (1/R) with the transmitted media signal in order to at least approximately restore the original media signal having embedded data.
- 25      8.        Apparatus according to claim 7, further comprising a watermark detecting unit (20) arranged to process the rescaled signal (r') in order to detect or extract the embedded data.
- 30      9.        Computer program product (40) for enabling at least identification the presence data symbols that have been embedded in a media signal, comprising a computer readable medium having thereon:
  - computer program code means, to make the computer do, when said program is loaded in the computer:

for an obtained transmitted media signal comprising a possibly distorted version of a host signal in which data symbols have been embedded by quantisation using a certain quantisation step size and to which dither with a set of dither values has been added,

provide several dither value intervals within the set, where each interval

5 corresponds to one or a small number of dither values,

determine a histogram for each dither value interval, where a histogram is determined for all sample values of a set of signal samples of the transmitted media signal having a dither value in the corresponding dither value interval,

combine the separate histograms corresponding to the intervals into a single

10 histogram, and

determine at least a rescaling factor based on the combined histogram in order to estimate the quantisation step size.